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Qualitative Phytochemical Analysis of Some Traditional Medicinal Plants of Hosur Area, Tamil Nadu

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Abstract: ***The phytochemical screening reveals the presence of various bioactive compounds like alkaloids, terpenoids, reducing sugar, phlobatannins and flavonoids. These compounds are used as drugs for curing various human diseases. These medicinal plants can also act as antimicrobial activities.This present study reveals the medicinal properties and phytochemical analysis of Mimosa pudica, Leucas aspera, Tridax procumbens, Punica granatum and Cymbopogon citratus. The leaves of these five medicinal plants were selected for the present study. The leaves samples were washed in fresh water, air dried at room temperature and then powdered using mixer. By using distilled water, the plants extracts are collected and used for phytochemical analysis. As a result, no plants have the presence of all the phytochemicals at the concentration of the extracting reagents. The results,shows that the plant Cymbopogon citratus shown the presence of three phytochemicals such as reducing sugar, alkaloids and terpenoids.Leucas asperashown negative results as absence of all phytochemicals.Punica granatum, Mimosa pudica, Tridax procumbensshown positive results as presence of two phytochemicals.Mimosa pudica shown the presence of phlobatannins and terpenoids. Punica granatum shown the presence of flavonoids and alkaloids. Tridax procumbens shown the presence of Reducing sugar and phlobatannins. The phytochemical analysis plays a major role in pharmaceuticals industries for production of drugs and vaccine for curing various human diseases.***

Key words - Phytochemicals, antimicrobial, terpenoids, flavonoids, medicinal properties, Phlobatannins, alkaloids, reducing **sugar.**

I. INTRODUCTION

Nature has been a source of medical agents since times immemorial. The importance of herbs in the management of human ailments cannot be over emphasized. Furthermore, the active components of herbal remedies have the advantage of being combined with many other substances that appear to be inactive. However, these complementary components give the plants as whole a safety and efficiency much superior to that of its isolated and pure active components (shariff, 2001).The ability to synthesis a wide variety of chemical compounds that are used to perform important biological functions, and to defend against attack from predators such as insects, fungi and herbivorous mammals is called herbal medicine. Many of these phytochemicals have beneficial effects on long-term health when consumed by humans, and can be used to effectively treat human diseases. At least 12,000 such compounds have been isolated so far; a number estimated to be less than 10% of the total (Tapsellet al, 2006) and (Lai and Roy, 2004).

Phytochemicals are primary and secondary constituents and secondary compounds. Chlorophyll, proteins and common sugars are includedin primary constituents and secondary compounds have terpenoids, alkaloids and phenolic compounds(Krishnaiahet al, 2007). Terpenoids exhibit various important pharmacological activities i.e., anti-inflammatory, anti-cancer, anti-malarial, inhibition of cholesterol synthesis, anti-viral and anti-bacterial activities (Mahato and Sen, 1997). Terpenoids are very important in attracting useful mites and consume the herbivorous insects (Kapperset al., 2005). Alkaloids are useful as anaesthetic agents and are found in medicinal plants(Herouart, etal., 1988).

Leucas asera is reported to have antifungal, prostaglandin inhibitory, antioxidant, antimicrobial, antinociceptive and cytotoxic activities (Prajapati, et al., 2010). It is also an antipyretic, it is a herb that has the ability to reduce fevers (Srinivasan, 2011).Mimosa pudica demonstrates both antioxidant and antibacterial properties. This plant has also been demonstrated to be non-toxic in brine shrimp lethality tests, which suggests that Mimosa pudica has low level of toxicity (Genest and Samuel, 2008). The recent studies have investigated that Punica granatum is used for the treatment of a number of diseases e.g., diabetes, dysentery,diarrhoea, cough, asthma, bleeding disorders, bronchitis, fever, AIDS, inflammation, ulcers, malaria, prostate cancer, hypertension, atherosclerosis, hyperlipidemia, male infertility, infant brain ischemia and obesity (Panhwar and Abro,2007). Traditionally, Tridax procumbens has been in use in India for wound healing and as an anticoagulant, antifungal, and insect repellent. The juice extracted from the leaves is directly applied on wounds. Its leaf extracts were used for infectious skin diseases in folk medicine. It is used in Ayurvedic medicine for liver disorders, hepatoprotection, gastritis, and heartburn (Wani et al., 2010). Tridax procumbens is also used as

treatment for boils, blisters, and cuts by local healers in parts of India (Nallella et al., 2013). Cymbopogon citratus oil is used as a pesticide and a preservative. Researchers shows that lemongrass oil has antifungal properties (Shadab*et al.*, 1992).

TABLE I

S.no	Medicinal plant species	Local name	Parts used	Family	Medicinal uses
1	*Punica granatum*	Pomogranate	Leaves	Lythraceae	Pomegranate seed oil contains punicic acid (65.3%), palmitic acid (4.8%), stearic acid (2.3%), oleic acid (6.3%), and linoleic acid (6.6%) (Shay Yehoshua Schubert *et al*., 1999)
2	*Leucas aspera*	Thumbai	Leaves	Lamiaceae	*Leucas aspera* is reported to have antifungal, prostaglandin inhibitory, antioxidant, antimicrobial, antinociceptive and cytotoxic activities (Prajapati*et al.*,2010)
3	*Mimosa pudica*	Touch me not plant	Leaves	Fabaceae	*Mimosa pudica* inhibits the myotoxicity and enzyme activity of cobra venom(Mahanta and Mukherjee, 2001). It has antioxidant and antibacterial properties(Genest and Samuel, 2008)
4	*Cymbopogon citratus*	Lemon grass	Leaves	Poaceae	Lemongrass oil is used as a pesticide and a preservative and has antifungal properties (Shadab *et al.*, 1992)
5	*Tridax procumbens*	Tridax daisy or Coatbuttons	Leaves	Asteraceae	*Tridax procumbens* is used for wound healing, as an anticoagulant, antifungal and insect repellent (Wani*et al.*, 2010)

Fig. 1 Medicinal Plants

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Cymbopogon citratus

Mimosa pudica

Leucas aspera

Punica granatum

Tridax procumbens

II. MATERIALS REQUIRED

A. Sample Collection

The plant species used in the present study were

TABLE II

S.no	Plant species	Area of samples collection
1	*Punica granatum*	Adhiyamaan College of Engineering, Hosur, Tamil Nadu, India
2	*Leucas aspera*	
3	*Mimosa pudica*	
4	*Cymbopogon citratus*	
5	*Tridax procumbens*	

B. Preparation of leaves powder

The leaves were washed in running tap water for few minutes to remove the dust. The washed leaves were shade dried for few days at room temperature. These dried leaves were crushed using mixer and stored in polythene bags for further study.

C. Extraction of phytochemicals

20gm of crushed leaves powder were taken and 200ml of distilled water was added to it. The soaked plant powders were shaken and filtered using Whatmann filter paper (No.1). The filtered plant extracts were used for further phytochemical analysis.

D. Reagents used

Ethanol, aqueous HCl, distilled water, Fehling solution A, Fehling solution B, chloroform, methanol, ammonia solution, picric acid, hexane and concentrated sulphuric acid.

III. PROTOCOL

A. Test for reducing sugar

1 g of the plant powder was added in 10ml of distilled water and shaken well. Then 2 ml of ethanol was mixed with the plant extract. 2 ml of Fehling solution A and 2 ml of Fehling solution B were taken in a test tube and heated in a hot plate stirrerfor few minutes, then it was added to aqueous ethanol extract. The colour change shows the presence of reducing sugar(Wadood A *et al.*, 2013).

B. Test for phlobatannins

1 g of plant powder was taken in a test tube and 10 ml of distilled water was added to it. Then it was shaken well for few minutes and filtered with Whatmann filter paper (No.1). Each plant extract was added with 2% aqueous hydrochloric acid and boiled in Hot plate stirrer for 10 mints. The formation of red colour precipitate shows the presence of phlobatannins (Wadood A *et al.*, 2013).

C. Test for alkaloids

0.4g of the plant powder was taken in a test tube and 6 ml of hexane was added to it. Then it was shaken well for few minutes and filtered with Whatmann filter paper (No.1). To filtrate, 10 ml of 2% HCl was added. The mixture was heated in hot plate stirrer for 10 minutes and filtered again usingWhatmann filter paper (No.1). Then a few drops of picric acid were added to the filtrate mixture. The presence of alkaloids was indicated by the formation of yellow colour precipitate(Wadood A *et al.*, 2013).

D. Test for terpenoids

1.6 g of plant powder was taken in a test tube, 20 ml of methanol was added to it and kept in shaker for 15 minutes The filtrate was filtered using Whatmann filter paper (No.1). 10 ml of filtrate was taken, 4 ml of chloroform was added and shaken well for few minutes. Then 6 ml of sulphuric acid was added to the filtrate. The presence of terpenoids in the selected plants was indicated by the formation of reddish brown colour(Wadood A *et al.*, 2013).

E. Test for flavonoids

1 g of plant powder was taken in a test tube, 20ml of distilled water was added and shaken well. Then 10 ml of dilute ammonia solution was added to the aqueous filtrate and 2 ml of concentrated sulphuric acid was added to the extract mixture. The presence of flavonoids ineach plant extract was indicated by the formation of yellow colour(Wadood A *et al.*, 2013).

IV. RESULTS AND DISCUSSION

The plants which have the phytochemicals are considered to have the active medicinal chemical components. The some of the phytochemicals present in the plants are terpenoids, alkaloids, flavonoids, phlobatannins and reducing sugar. As a result, no plant species have shown the presence of all phytochemicals. The results show that the plant Cymbopogon citratus shown the presence of three phytochemicals such as reducing sugar, alkaloids and terpenoids. Leucas asperashown negative results as absence of phytochemicals. Punica granatum, Mimosa pudica, Tridax procumbensshown positive results as presence of two phytochemicals. Mimosa pudica shown the presence of phlobatannins and terpenoids. Punica granatum shown the presence of flavonoids and alkaloids. Tridax procumbens shown the presence of Reducing sugar and phlobatannins.

Reducing properties were present in Cymbopogon citratus and Tridax procumbens. Phlobatannins were present in Mimosa pudica and Tridax procumbens. Phlobatannins have been reported for its wound healing properties,these are anti-inflammatory and analgesic (Ayindeet al., 2007) and antioxidant (Okwu DE and Okwu ME, 2004). Terpenoids were present in Mimosa pudica and Cymbopogon citratus. Terpenoids are reported to have anti-inflammatory, anti-viral, antimalarial,inhibition of cholesterol synthesis and anti-bacterial (Mahato and Sen, 1997). Flavonoids are present only in Punica granatum. Epidemiologic studies recommend that coronary heart disease is opposed by dietary flavonoids. Alkaloids are present inCymbopogon citratus and Punica granatum. Plants having alkaloids are used in medicines for reducing headache and fever.These are attributed for antibacterial and analgesic properties (Pietta, 2000).

TABLE III

S.no	Plant species	Reducing sugar	Phlobatannins	Alkaloids	Terpenoids	Flavonoids
1	*Punica granatum*	Absent (No colour change)	Absent (No formation of red colour precipitate)	Present (Formation of yellow colour precipitate)	Absent (No formation of reddish brown colour)	Present (Formation of yellow colour)
2	*Leucas aspera*	Absent (No colour change)	Absent (No formation of red colour precipitate)	Absent (No formation of yellow colour precipitate)	Absent (No formation of reddish brown colour)	Absent (No formation of yellow colour)
3	*Mimosa pudica*	Absent (No colour change)	Present (Formation of red colour precipitate)	Absent (No formation of yellow colour precipitate)	Present (Formation of reddish brown colour)	Absent (No formation of yellow colour)
4	*Cymbopogon citratus*	Present (Colour change occurs)	Absent (No formation of red colour precipitate)	Present (Formation of yellow colour precipitate)	Present (Formation of reddish brown colour)	Absent (No formation of yellow colour)
5	*Tridax procumbens*	Present (Colour change occurs)	Present (Formation of red colour precipitate)	Absent (No formation of yellow colour precipitate)	Absent (No formation of reddish brown colour)	Absent (No formation of yellow colour)

This research was carried out in five medicinal plants for the presence or absence of phytochemicals such as, flavonoids, alkaloids, phlobatannins, terpenoids and reducing sugar. The results were tabulated. The Punica granatum shown the presence ofalkaloids and flavonoids and absence of reducing sugar, terpenoids and phlobatannins. In the (Pietta, 2000) study it has been shown that flavonoids and terpenoids were present in aqueous extract of the Punica granatum, while alkaloids andphlobatannins were found to be absent in it.The present results were different. This might be due to the changein location and genetic variation due to cross pollination, so their genetic makeup was changed and shows the different results (Wadood Aet al., 2013).

In present investigation, the plant Cymbopogon citratusshows the presence of alkaloids and absence of flavonoids. (Umar et al., 2016)investigation shows the presence of flavonoids and alkaloids. The result changesmay be due to the variation of chemical reagent.

In the present study the plant Mimosa pudica shows the absence of flavonoids and alkaloids. (Ranjeet Kumar Ranjan et al., 2013) investigation also shows the absence of flavonoids and alkaloids.In (Ranjeet Kumar Ranjan et al., 2013)study it was extracted with the help of ethanol but in present study the flavonoids are extracted with distilled water and alkaloids are extracted with the hexane.

In the present study the plant Leucas aspera shows the absence of flavonoids, alkaloids and terpenoids. (Lathaet al., (2013) study shows the presence of alkaloids and flavonoids and absence of terpenoids. It may be due to the variation in chemical reagents from which it was extracted.

In the present study the plant Tridax procumbens shows the absence of alkaloids, flavonoids and presence of phlobatannins. (Rajaram S. Sawant and Ashvin G. Godghate, 2013)study shows the presence of flavonoids, alkaloids and absence of phlobatannins.It may be due to the difference in reagents from which it was extracted.

V. CONCLUSION

The selected five plants have medicinal properties and has phytochemical components such as flavonoids,alkaloids, phlobatannins, reducing sugar and terpenoids. The anti-inflammatory, antifungal, prostaglandin inhibitory, antioxidant, antimicrobial, antinociceptive, cytotoxic activities and anticoagulant activities in the above medicinal plants are due to the presence of these secondary metabolites. The screening and analysis of phytochemical components in the medicinal plants are used for the production of new drugs which are used for diagnosis of many diseases. The results are someway similar to the previous studies but some differences are due to the genetic variation and chemical reagents used for the extraction. Thus we hope that the phytochemical results given above will be useful for the manufacturing of new drugs.

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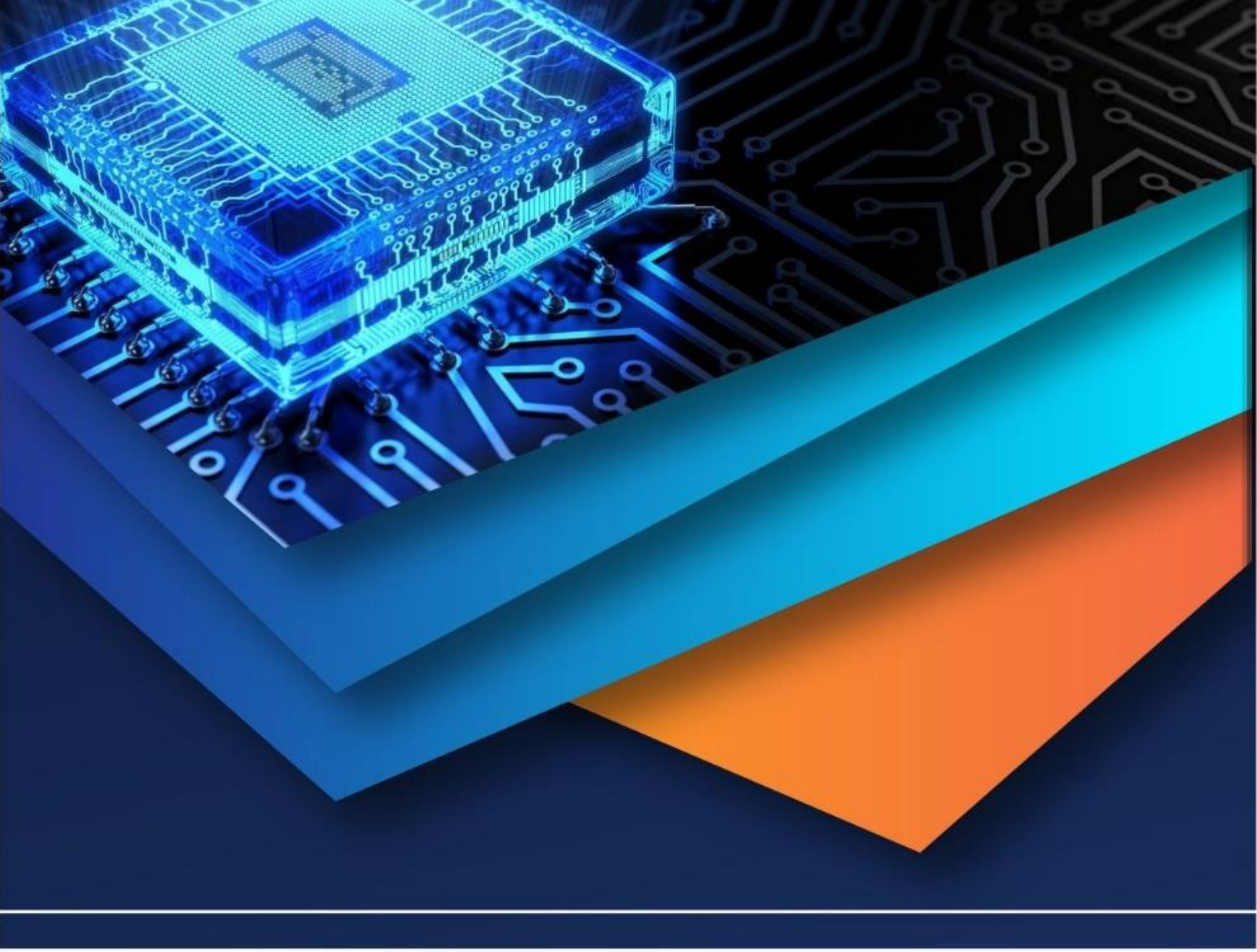

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